REMARKS

Independent claims 36 and 43 have been amended to further distinguish from the art of record and to place the claims in better form for appeal in case the Examiner does not now find the claims allowable.

Independent claim 36 is directed toward a method of making a generally pot shaped sputter target having a first sputtering region which defines a planar end wall or dome. The pot shaped target also has a second sputtering region that defines a sidewall that is connected to and extends from the first sputtering region. In accordance with the method, to enhance sputtering uniformity, the first and second sputtering regions each have different crystallographic orientations. First, a metal blank is provided having a given crystallographic orientation. The blank has a first area that, as a result of the forming step, will define the first sputtering region of the target. The blank further has a second area that, as a result of the forming, will define the second sputtering region of the target. This blank is placed in a hydroforming press wherein relative movement between the mandrel of the press and the bladder is provided to press the blank therebetween. The blank is cold worked in the second area thereof to thereby deform that second area to about 35% or greater. After the forming process, the blank is released from the press yielding a sputtering target having a second sputtering region with a crystallographic orientation that is different from the given crystallographic orientation of the blank. This second sputtering region is also different from the crystallographic orientation of the first sputtering region formed in the process.

The inventors have found that it is desirable to impart different crystallographic orientations to different sputtering regions of the target to enhance sputtering performance of a pot shaped target. For example, in a pot shaped or hollow cathode target, it is desirable to have different crystallographic orientations along the sidewalls and along the planar or dome shaped region of the target. In this way, and as set forth in paragraph **[0009]** of the specification, these different crystallographic orientations in the dome and sidewalls emit sputter materials at different angles. These differing angles of emission beneficially affect the uniformity and density of the depositions of the sputter material on the desired surface.

In a preferred embodiment, and as made the subject of dependent claims 41 and 42, a tantalum target is provided wherein the first sputtering surface is provided with a crystallographic orientation of a mixed {111}/{100} texture (claim 41), and the second sputtering surface has a mixed {112}/{110} texture.

Independent claim 43 is provided toward a method for forming a sputter target assembly having first and second sputtering surfaces with the first sputtering surface having a first crystallographic orientation and the second sputtering surface having a second crystallographic orientation that is different than a first crystallographic orientation. A metallic blank having a first crystallographic is provided, and the blank is cold worked in a second area of the blank so that it is deformed to an extent of about 35% or greater, to thereby form a sputter target wherein the first sputtering surface thereof has the first crystallographic orientation, and the second sputtering surface has a second crystallographic orientation. As is made the subject of dependent claim 44, the method is devoid of any heat treatment annealing so that the second region of the blank does not recrystallize. Further, in another embodiment, as is set forth in claims 48-49, tantalum is selected as the metal, and the first crystallographic orientation of the blank is mixed {111}/{100}, and cold working of the second area of the blank imparts a mixed crystallographic orientation of {112}/{110} to the second sputtering region of the target.

All of the claims at bar stand rejected on art based grounds. Specifically, the Examiner has relied upon Ford et al., U.S. Patent 6,887,356; Kulkarni et al. U.S. Patent 6,283,357, and Rhoades et al., U.S. Patent 5,085,068, with rejection of certain of the existing claims being predicated on Ford et al. '356 singly. Instead of repeating the distinctions over those references set forth in applicants' previous amendments submitted on July 2, 2008 and July 28, 2008, applicants will confine the instant remarks to rebuttal of the "Response to Arguments" section of the Final Rejection. This distinctions made previously over the art of record are hereby incorporated by reference.

The Examiner relies upon the portion of Ford et al. wherein it is stated that <u>at</u> <u>least</u> the sidewalls have a homogeneous microstructure. The Examiner construes this to mean that the

sidewalls are provided with one microstructure, and that the end wall or dome does not have this homogenous microstructure. In response, the Ford et al. disclosure contains two embodiments. In the first embodiment, the entirety of the blank is worked in a similar fashion. That is, the entire blank is cold rolled in a first direction A and then in a second direction B perpendicular to direction A for a number of times. As is set forth in column 6, lines 63 to column 7, line 4, the thus worked blank is formed into the desired hollow cathode magnetron shape by deep drawing or spin forming. Accordingly, in this embodiment, the dome and the sidewalls have the same crystallographic orientation.

In another embodiment detailed at column 9, lines 50 et seq., the top portion 15' of the target is made of a <u>sputtering-resistant material</u> in contrast to the instant claims which all require a first sputtering region and a second sputtering region wherein the second sputtering region has a different crystallographic orientation than the first sputtering region. In other words, in the claimed invention, two distinct <u>sputtering</u> regions are provided. In column 10, lines 20-30 of Ford et al., it is pointed out that the provision of such a nonsputtering top portion for the target advantageously limits erosion to the sidewalls of the sputtering target while retarding the sputtering rate along the top interior surface thereof. This is in sharp contrast to the requirement of the instant claims which require both a first and second sputtering region wherein both regions actively sputter (i.e., sputtering regions). In accordance with this second disclosed embodiment of Ford et al., the top portion of the target is preferably welded or otherwise attached to the sidewalls of the cylindrical target 3'. The sidewalls of the target have been prepared in accordance with the rolling techniques previously discussed.

Accordingly, in summary with regard to the Ford et al. reference, this reference is devoid of any suggestion of a provision of a target having two different <u>sputtering</u> surface regions wherein each of the regions has a different crystallographic orientation. As set forth above, in the first embodiment disclosed in Ford et al. '356, the top and sidewalls would have the same crystallographic orientation. In the second embodiment of the '356 patent, the top wall is a non-

sputtering component. Further, this reference is deficient in any teaching of the specific tantalum construction and orientations set forth in dependent claims 41 and 42 and 48-49.

Turning now to Kulkarni et al. '357, to be sure, this discloses a hollow cathode magnetron sputter target. The disclosure indicates that the sputtering target is preferably formed by deep drawing so that the microstructure of the target material is not significantly altered. (See column 2, lines 39-41). This portion of the reference expressly teaches against the concept herein set forth in all claims, namely the provision of two distinct sputtering regions of the sputter target wherein each region has a different crystallographic orientation. To be sure, Kulkarni et al. '357 also mentions that other metal working operations such as forging, hydroforming, explosive forming, punching, roll forming, stretch forming, and electromagnetic forming may be provided. However, the Kulkarni et al. '357 reference provides no teaching as to the manipulation of any of these methods to form two distinct sputtering regions of a sputter target wherein each region is provided with a different crystallographic texture, thus providing differing sputtering emission vectors in each region.

Rhoades et al. '068 does not teach the utilization of a hydroforming method in conjunction with sputter target formation and, *ipso facto*, is deficient in any teaching of the utilization of a hydroforming method to provide two distinct sputtering regions of a target wherein the first sputtering region has a first crystallographic orientation and the second sputtering region has a second crystallographic orientation. It is also noted that in the rejections set forth by the Examiner, the Examiner points to Figs. 1 and 3-5 of Rhoades as depicting a first and second region of a blank being deformed by over 35%. This is speculation since the Rhoades et al. disclosure is devoid of any explicit suggestion of such deformation. Where is this specific deformation taught in the specification or drawings? Further, it is noted that in independent claims 35 and 43, only a portion of the blank is subjected to this deformation. What portion of Rhoades et al. teaches that only a specific portion of the blank should be so deformed? Also, the Examiner cites to Fig. 3 of Kulkarni et al. for the same purpose. Here, again, Kulkarni et al. Fig. 3 merely

shows a cross section of a hollow cathode magnetron target and does not teach the specific forming steps herein required in the claims at bar.

For all of the above reasons, it is respectfully submitted that the claims are in proper form allowance. Such action is accordingly solicited.

The Examiner is invited to call the undersigned attorney if, during the course of reconsideration of this application, any question or comment should arise.

Respectfully submitted,

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